J. HAYES, Jr.

FEEDING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED FEB. 6, 1909.

1,139,863. Patented May 18, 1915.

3 SHEETS—SHEET 1.

Fig. 4.

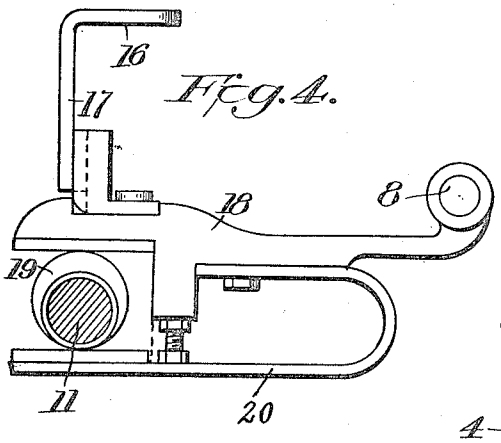


Fig. 1.

Witnesses

C. Walker

Albert Popkins

Inventor

John Hayes Jr.

By

Stuntevant & Mason

Attorneys

J. HAYES, JR.

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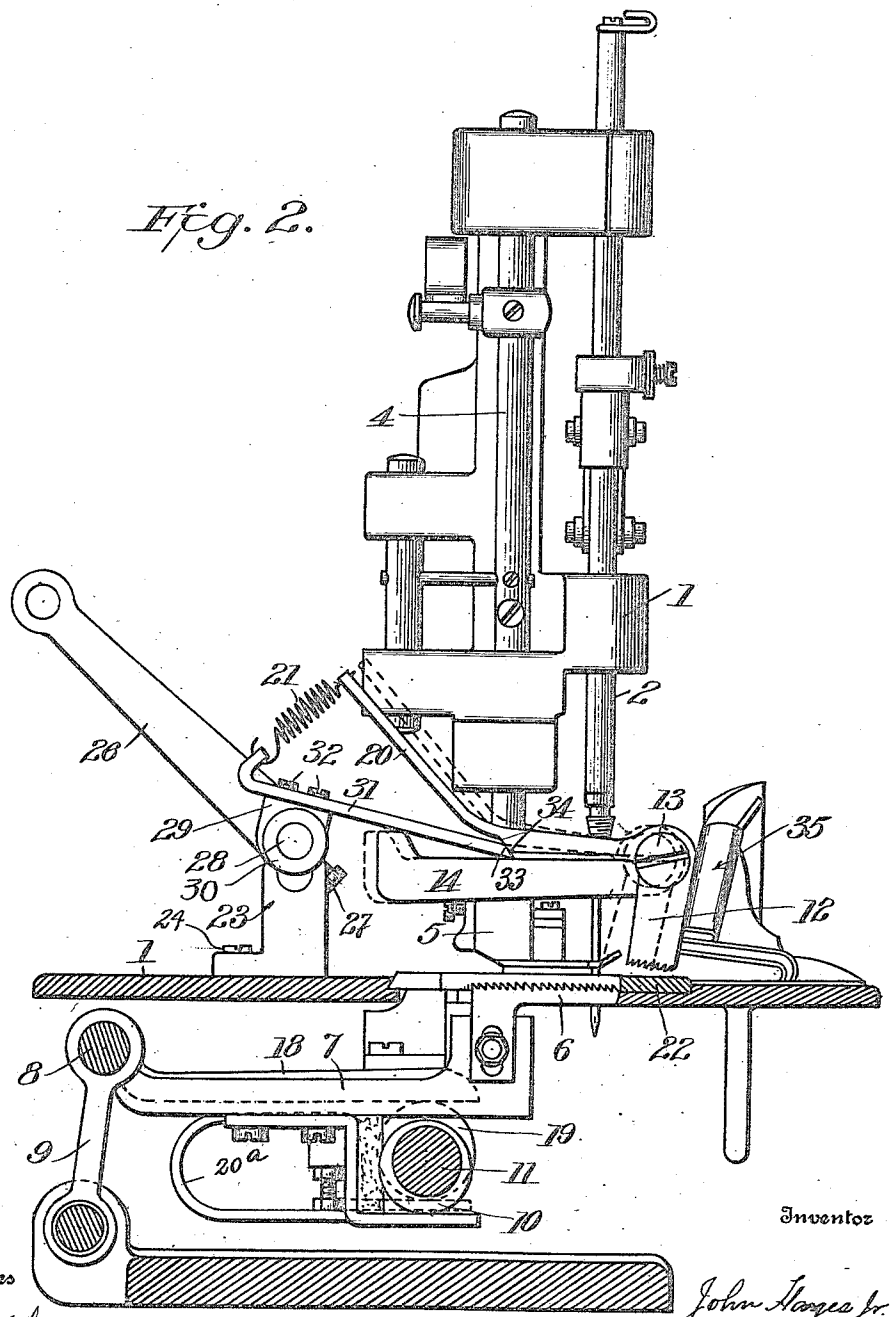
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

M. Walker

Albert Popkins

Inventor

John Hayes Jr.

By

Sturtevant & Mason

Attorneys.

J. HAYES, JR.

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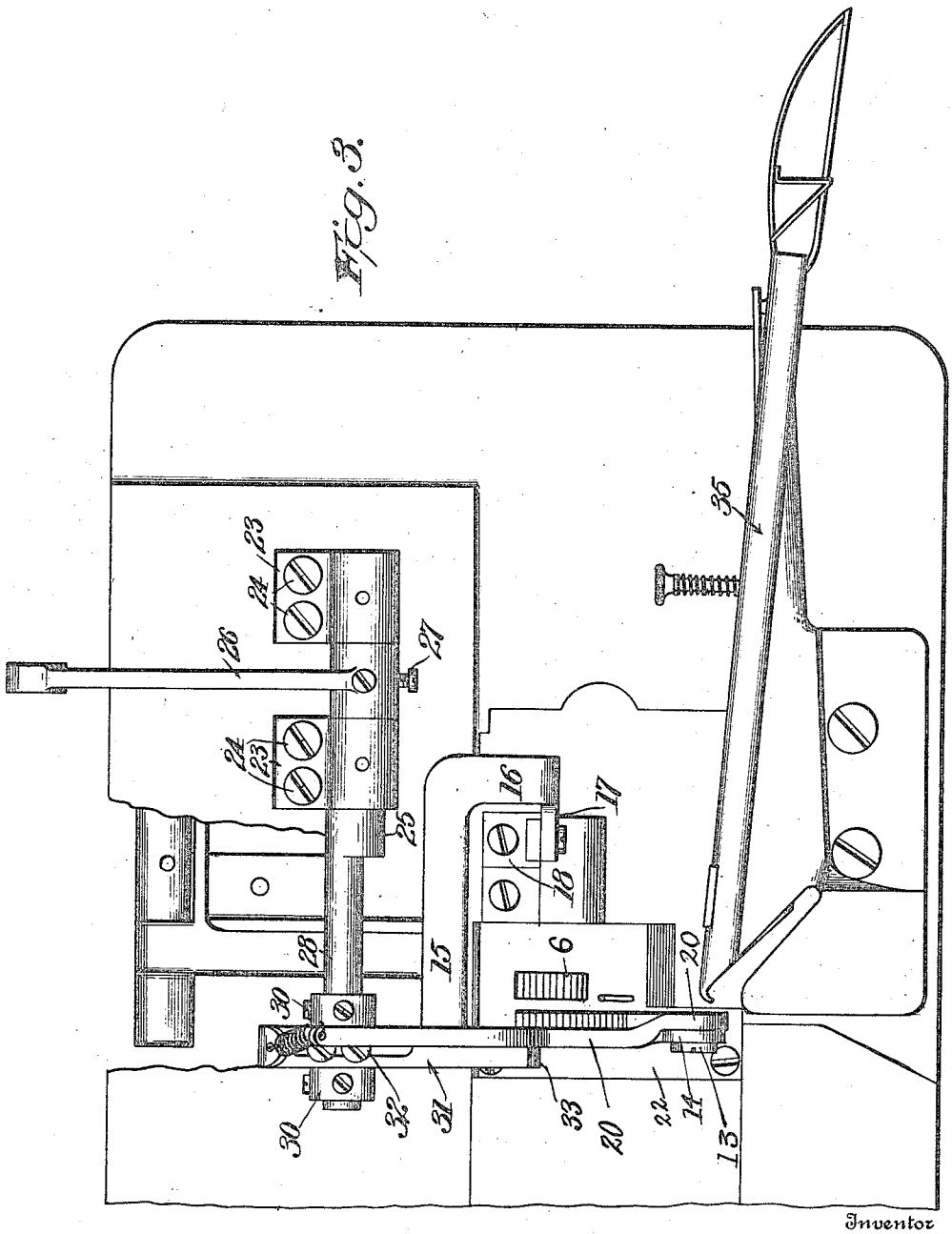
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3 SHEETS—SHEET 3.

Fig. 3.



Inventor

Witnesses

C. M. Walker

Albert Popkins

John Hayes Jr.

By Sturtevant Mason

Attorneys

UNITED STATES PATENT OFFICE.

JOHN HAYES, JR., OF AMSTERDAM, NEW YORK, ASSIGNOR TO UNION SPECIAL MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

FEEDING MECHANISM FOR SEWING-MACHINES.

1,139,863. Specification of Letters Patent. Patented May 18, 1915.

Application filed February 6, 1909. Serial No. 476,574.

To all whom it may concern:

Be it known that I, JOHN HAYES, Jr., a citizen of the United States, residing at Amsterdam, in the county of Montgomery, State of New York, have invented certain new and useful Improvements in Feeding Mechanism for Sewing-Machines, of which the following is a description, reference being had to the accompanying drawing and to the letters and figures of reference marked thereon.

The invention relates to new and useful improvements in sewing machines, and more especially to the feeding mechanism of a sewing machine.

The invention as herein shown is especially adapted to machines of the character which operate to full or gather a piece of fabric prior to stitching the same, or full or gather one piece of fabric relative to another, and secure the same together. When placing a binding strip or the like upon a knitted fabric, and more especially when binding across the wales of the knitted fabric, the knitted fabric is very apt to become stretched or distorted in the stitching operation. By my improved mechanism, the knitted fabric may be fed slightly faster than the binding strip or non-elastic fabric, thus overcoming the tendency of the knitted fabric to stretch, so that the two pieces of fabric will be evenly and smoothly stitched together. It is sometimes desirable, when stitching one piece of fabric to another of the above character, to cause the fulling action of the feeding mechanism to cease, as for example, when crossing stay strips or the like. The invention, therefore, contemplates providing mechanism whereby the fulling action of the feeding mechanism may be rendered ineffective whenever desired, without stopping the stitching mechanism.

The invention consists in the parts, arrangements and improvements hereinafter shown, described and pointed out in the appended claims.

In the drawings, which show by way of illustration, one embodiment of the invention, Figure 1 is an end view of a sewing machine with my improved feeding mechanism attached thereto, certain parts of the machine being in section, in order to show the lower feed. Fig. 2 is a similar view showing the controlling lever thrown to a position so as to cause the auxiliary feed to have a differential movement imparted thereto. Fig. 3 is a top plan view of the feeding mechanism, also showing the work support and the binder for feeding a strip of binding. Fig. 4 is a detail view showing the cam for operating the auxiliary feed dog.

The sewing machine as herein shown, includes an overhanging arm 1, in which reciprocates the needle bar 2, carrying a needle 3. A presser bar 4 is also mounted in the overhanging arm and carries a presser foot 5. These parts are of the usual construction, and will not need further description.

The main feed dog 6, is adjustably secured to the feed bar 7, which in turn is pivoted at 8 to the rocking frame 9, which is rocked back and forth from a crank arm on the forward end of the main shaft, in the usual manner. The main feed dog 6, receives its up and down movement from a cam 10, mounted on the main shaft 11. This main feeding mechanism is of the usual type, and the construction of the same will be readily understood from the above description.

Coöperating with the main feed dog 6, is an auxiliary feed dog 12. Said auxiliary feed dog 12, is carried by a pivot bolt 13, secured to the outer end of an arm or feed bar 14, which extends along side of the presser bar and needle bar, to a point in rear of the needle head, where it is deflected laterally as at 15 (Fig. 3), and then forwardly as at 16, and thence downwardly as at 17, where it is secured to the auxiliary feed supporting bar 18. Said auxiliary feed supporting bar is pivoted to the rocking frame 9, at substantially the point 8, so that as the rocking frame moves back and forth, the auxiliary feed bar likewise, moves back and forth. Said auxiliary feed bar is moved up and down by means of a cam 19, which is mounted on the main shaft 11, and oppositely disposed to the cam 10, so that as the main shaft rotates, the main feed will be lowered away from the fabric at the same time the auxiliary feed is raised upward above the fabric, and then when the main feed is brought into contact with the fabric, to feed the same by its backward

movement, the auxiliary feed dog will likewise be brought into engagement with the fabric to give thereto its feeding movement.

The auxiliary feed bar 18 is held on its operating cam by means of a spring arm 20^a, which is secured to the auxiliary feed bar and extends underneath said cam where it is provided with a bearing surface which engages said cam. The auxiliary feed dog 12 is provided with a rearwardly extending shank or arm 20. Said arm 20 lies in substantially the same vertical plane as the arm or feed bar 14 and a spring 21 normally holds the arm 20 in contact with the arm 14.

The auxiliary feed dog 12, is located as shown in Figs. 1 and 3, in front of and slightly at one side of the stitching point. Said auxiliary feed dog as herein shown, coöperates with a smooth portion of the throat plate 22, and operates upon the material, also in advance of the main feed.

In the operation of the parts as above described, the auxiliary feed dog moves in unison with the main feed dog, and assists in feeding the material to the stitching point. At the rear of the machine, is a pair of brackets 23, which are secured to the work support by suitable screws 24. A shaft 25 is mounted in said brackets 23, 23, and an arm or lever 26 engaging the shaft 25 between the brackets 23, is secured thereto by a set screw 27. Said shaft 25 is provided with an eccentrically set extension 28, on which is freely mounted a bearing block 29. Said bearing block is held on said extension against lateral movement by the stop collars 30, 30. Adjustably mounted on the bearing block 29 is an arm 31 which is secured to said bearing block by the slot and screw connection 32. The arm 31 at its forward end normally rests on the arm or bar 14 carrying the auxiliary feed dog. As the auxiliary feed dog moves back and forth and up and down, in its feeding movements, the arm 31, together with its bearing block, swings about the extension of the shaft 25. The spring 21 which engages the arm 20 at one end, engages the arm 31 at its other end, and not only holds the arm 20 in contact with the arm 14, but also holds the arm 31 against the arm 14. When the lever 26 is in the position shown in Fig. 1, the forward end of the arm 31 is so disposed that in the vibration of the auxiliary feed dog back and forth, the arm 20 does not contact with the arm 31. If however, the lever 26 be swung to the position shown in Fig. 2, the extension 26 is then moved toward the front of the machine by the oscillation of the shaft 25, the arm 31 is carried forward, so that the arm 20 supporting the auxiliary feed dog will contact with the arm 31, during each of its feeding movements. The arm 31 is beveled at its forward end, so as to provide a cam shoulder or abutment 33 which engages a similar cam shoulder 34 on the arm 20. When the arm 20 therefore, contacts with the arm 31, the cam shoulder operates to swing the arm 20 about the pivot bolt 13, and thus impart to the auxiliary feed dog, an additional movement. The additional or differential movement of the auxiliary feed dog will of course, depend upon the position of the arm 31, and it will be readily seen that by the swinging of the lever 26 up or down more or less, the auxiliary feed dog may be caused to move in unison with the main feed dog, or a differential movement may be given thereto of any degree within certain limits. By the term "unison" I mean that the auxiliary feed dog is moved back and forth in the same timing as the main feed dog, having the same length of feed stroke so that the effective feeding action on both the upper and lower faces of the fabric will be the same.

In the present embodiment of my invention, I have shown my improved differentially moving feed dog, as used in connection with a machine for stitching a binding on to another piece of fabric which is preferably knitted elastic fabric. The binding is led through the binder 35, from which it passes to the stitch forming mechanism. The main feed dog is preferably so located as to engage the binding strip, and the knitted fabric, while the auxiliary feed dog is so disposed as to engage only the knitted fabric in advance of the stitching point.

When stitching a knitted fabric to a strip of binding, the knitted fabric is apt to become stretched or distorted in the stitching operation. By my differential moving auxiliary feed dog, the knitted fabric advances a little faster than the binding strip, so that this stretching action is overcome and the knitted fabric smoothly and evenly attached to the binding strip. When however, a stay strip or other non-elastic portion of the body fabric reaches the stitching point, it is desirable to cause the differential movement of the auxiliary feed dog to cease temporarily, otherwise the stay strip or non-elastic would be fulled or gathered.

By my improved controlling mechanism the auxiliary feed dog may be caused quickly without stopping, or without retarding the stitching mechanism, to move in unison with the main feed dog, until after the non-elastic portion of the body fabric has passed the stitching point, after which the auxiliary feed dog may be readily controlled so as to again have a differential movement imparted thereto.

Having thus particularly described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The combination of a stitching mecha-

nism, a work support, and a feeding mechanism including a feed dog, a bar to which said feed dog is pivoted, means for moving said bar back and forth and up and down, to impart to said feed dog its feeding movements, means for swinging said feed dog about its pivot, whereby a horizontal feeding movement in addition to the movement derived from the feed bar is imparted to the feed dog, and means whereby the oscillating movement of the feed dog about its pivot may be varied without stopping the stitching mechanism.

2. The combination of a work support, stitch forming mechanism, and feeding mechanism including a main feeding member, an auxiliary feeding member, means for moving said auxiliary member in unison with the main feeding member, and normally inactive means independent of the means for moving the auxiliary member back and forth adapted to be brought into operation at the will of the operator, for giving to said auxiliary feeding member, a different rate of movement relative to the main feeding member.

3. The combination of a work support, and a feeding mechanism including a main feed dog, an auxiliary feed dog, means for moving said auxiliary feed dog faster than the main feed dog, including an abutment and means under the control of the operator for varying the position of said abutment, whereby the speed of the auxiliary feed dog relative to the main feed dog, may be varied.

4. The combination of a work support and a feeding mechanism, including a main feed dog, an auxiliary feed dog, means for giving said auxiliary feed dog, a feeding movement in unison with the main feed dog, an abutment and means under the control of the operator for causing said abutment to impart a different rate of movement to the auxiliary feed dog relative to the main feed dog.

5. The combination of a work support, stitch forming mechanism and a feeding mechanism, including a main feed dog, an auxiliary feed dog engaging the material in advance of the stitching mechanism, a feed bar to which said auxiliary feed dog is pivoted, means for moving said feed bar back and forth and up and down for imparting feeding movements to said auxiliary feed dog, means for oscillating said auxiliary feed dog on its pivot in the direction of the line of feed, whereby a differential feeding movement is imparted to the auxiliary feed dog, and means whereby the oscillating movement of said auxiliary feed dog, may be varied without stopping the stitching mechanism.

6. The combination of a work support, stitch forming mechanism, and a feeding mechanism, including a main feed dog, a feed bar on which said feed dog is carried, means for moving said feed bar back and forth and up and down, for giving to said feed dog its feeding movements, an auxiliary feed dog, an auxiliary feed bar to which said auxiliary feed dog is pivoted, means for moving said auxiliary feed bar up and down and back and forth to impart feeding movements to the auxiliary feed dog, and means under the control of the operator, for swinging said auxiliary feed dog about its pivot in the direction of the line of feed, whereby a differential feeding movement is imparted to the auxiliary feed dog.

7. The combination of a work support, stitch forming mechanism and a feeding mechanism including a main feed dog, a feed bar therefor, means for moving said feed bar back and forth and up and down, for imparting a feeding movement to said feed dog, an auxiliary feed dog, an auxiliary feed bar to which said auxiliary feed dog is pivoted, means for moving said feed bar back and forth and up and down, for imparting a feeding movement to said auxiliary feed dog, an abutment coöperating with said feed dog for imparting a differential feeding movement to said auxiliary feed dog.

8. The combination of a work support, stitch forming mechanism and a feeding mechanism including a main feed dog, a feed bar therefor, means for moving said feed bar back and forth and up and down for imparting a feeding movement to said feed dog, an auxiliary feed dog, a feed bar to which said auxiliary feed dog is pivoted, means for moving said feed bar back and forth, and up and down, for imparting a feeding movement to said auxiliary feed dog, an abutment coöperating with said pivoted feed dog, for imparting a differential feeding movement to said auxiliary feed dog, and means under the control of the operator for varying the position of said abutment, whereby said differential movement may be varied.

9. A feeding mechanism including in combination a feed dog, a feed bar to which said feed dog is pivoted, means for moving said feed bar back and forth and up and down for imparting a feeding movement to said feed dog, said feed dog having an arm provided with a cam shoulder and an abutment adapted to be brought into engagement with said cam shoulder, for swinging said feed dog on its pivot, whereby an additional feeding movement may be imparted to the feed dog.

10. A feeding mechanism including in combination a feed dog, a feed bar to which said feed dog is pivoted, means for moving said feed bar back and forth and up and down, for imparting a feeding movement to said

feed dog, said feed dog having an arm provided with a cam shoulder, and an abutment adapted to be brought into engagement with said cam shoulder for swinging said feed dog on its pivot, whereby an additional feeding movement may be imparted to the feed dog, and means under the control of the operator for varying the position of the abutment, whereby the amount of additional feeding movement is varied.

11. A feeding mechanism including in combination, a feed bar, a feed dog pivoted thereto, and having a rearwardly extending arm overhanging said feed bar, a spring normally holding said arm in contact with said bar, and an abutment adapted to engage said arm and swing said feed dog about its pivot.

12. A feeding mechanism including in combination, a feed bar, a feed dog pivoted thereto, and having a rearwardly extending arm overhanging said feed bar, a spring normally holding said arm in contact with said bar, and an abutment adapted to engage said arm and swing said feed dog about its pivot, and means under the control of the operator for varying the position of said abutment.

13. A feeding mechanism including in combination, a feed bar, a feed dog pivoted to said feed bar, said feed dog having an arm overhanging said feed bar, and normally resting thereon, a shaft, an eccentrically-located extension carried by said shaft, a bearing block carried by said extension, an arm carried by said bearing block and located in the plane of movement of the arm of the auxiliary feed dog, and means for oscillating said shaft whereby said arm carried thereby may be moved so as to contact with the arm of the auxiliary feed dog and swing said arm about its pivot.

14. A feeding mechanism including in combination a feed bar, a feed dog pivoted to said feed bar, said feed dog having an arm overhanging said feed bar and normally resting thereon, a shaft, an eccentrically-located extension carried by said shaft, a bearing block carried by said extension, an arm carried by said bearing block and located in the plane of movement of the arm of the auxiliary feed dog, and means for oscillating said shaft whereby said arm carried thereby may be moved so as to contact with the arm of the auxiliary feed dog, and swing said arm about its pivot, and means for adjusting the arm carried by said shaft on its supporting block.

15. A feeding mechanism including in combination, a feed bar, a feed dog pivoted to said feed bar, said feed dog having an arm overhanging said feed bar, and normally resting thereon, a shaft, an ecentrically-located extension carried by said shaft, a bearing block carried by said extension, an arm carried by said bearing block and located in the plane of movement of the arm of the auxiliary feed dog, means for oscillating said shaft whereby said arm carried thereby may be moved so as to contact with the arm of the auxiliary feed dog and swing said arm about its pivot, a spring engaging the arm of the auxiliary feed dog for holding the same against the feed bar, said spring also holding the arm carried by said shaft in contact with said feed bar.

16. A feeding mechanism including in combination, a feed bar, means for moving said feed bar, an auxiliary feed dog pivoted to said feed bar, an arm carried by said auxiliary feed dog, and overhanging said feed bar, a cam shoulder formed on said arm, a shaft, an eccentrically-located extension carried by said shaft, an arm pivotally supported on said extension, said arm having a cam shoulder at its forward end, which may be brought into contact with the cam shoulder on the arm of the feed dog, for oscillating said feed dog about its pivot.

17. A feeding mechanism including in combination a feed bar, means for moving said feed bar, an auxiliary feed dog pivoted to said feed bar, an arm carried by said auxiliary feed dog, and overhanging said feed bar, a cam shoulder formed on said arm, a shaft, an eccentrically-located extension carried by said shaft, an arm pivotally supported on said extension, said arm having a cam shoulder at its forward end which may be brought into contact with the cam shoulder on the arm of the feed dog, for oscillating said feed dog about its pivot, and means under the control of the operator for oscillating said shaft.

18. The combination of a work support, a main feed dog engaging the material from beneath the work support, an auxiliary feed dog engaging the upper surface of the material on said work support, a feed bar to which said auxiliary feed dog is pivoted, said auxiliary feed dog having a rearwardly extending arm resting on said feed bar, brackets mounted on said work support, a shaft carried by said brackets, an eccentrically-located extension carried by said shaft, a bearing block pivoted to said extension, an arm carried by said bearing block and located in the plane of movement of said feed bar, coöperating cam shoulders formed on said arm carried by said extension and the arm of said feed dog, a spring connecting the arm of said feed dog to the arm carried by said extension and a lever connected to said shaft, and adapted to be moved by the operator.

19. The combination of a stitch-forming mechanism, a work support and a feeding mechanism including a feed dog, a feed bar for supporting said feed dog, means for moving said feed bar back and forth and

up and down to impart to said feed dog its feeding movements, and additional means under the control of the operator without stopping the stitch forming mechanism for moving said feed dog relative to the feed bar during a part of its travel, whereby said feed dog is given a differential movement relative to the feed bar.

20. In a sewing machine, a work support and a feeding mechanism comprising a feed dog operating below the work support, a feed bar supporting and giving the reciprocating feed movement to said feed dog, a feed dog operating above said work support, a feed bar supporting and giving the reciprocating feed movement to said last named feed dog, means for moving the feed bars back and forth in unison and means under the control of the operator for accelerating the movement of one of said feed dogs relative to its supporting feed bar and on its work feeding movement.

21. In a sewing machine a feeding mechanism, a pivoted feed bar, a feed dog carried by said feed bar, means for giving said feed bar and feed dog a bodily movement in a prescribed path and means moving said feed bar about its pivot for accelerating the movement of said feed dog in a predetermined portion of said path.

22. A feeding mechanism including in combination a feed bar, a feed dog pivoted to said feed bar, said feed dog having a fabric engaging portion extending substantially at right angles to the feed bar, and an arm substantially parallel with said feed bar rigidly connected with said fabric engaging portion, and means for normally holding said arm in contact with said feed bar.

In testimony whereof I affix my signature, in presence of two witnesses.

JOHN HAYES, JR.

Witnesses:

HARVEY BOOK,

J. F. KELLY.